2.0 Regulation Governing Individual Onsite Wastewater Disposal

Design Standard IV
Subsurface Drip Disposal System

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DESIGN STANDARD IV
SUBSURFACE DRIP DISPOSAL

I. Introduction

The subsurface drip disposal system is a subsurface disposal system which has three basic design principles different from conventional subsurface disposal systems. They are (1) uniform distribution of effluent, (2) dosing and resting cycles and (3) shallow placement of trenches. This system uses small diameter pipe with underground emitters and must be preceded by a treatment system that conforms to the manufacturer's specifications particular to that system. The effluent must be adequately filtered before distribution through the underground emitter system.

II. General

1. To insure equal dosing of the field there can be no more than a 10% variance in the flow between any two emitters in the entire absorption field. All system placement requirements must be in compliance with criteria for a conventional subsurface disposal system.

2. The subsurface drip disposal system shall be designed and installed in such a manner that during normal operating procedures the inlet to the treatment facility will not become surcharged.

3. The primary treatment facility and dosing chamber shall be designed, constructed and installed so all joints, seams, and component parts shall preclude infiltration of groundwater, and prevent escape of wastewater or liquids.

4. Electrical equipment shall be protected with safety devices (overload interrupting devices, fuses, etc.). Electrical equipment shall comply with appropriate National Electrical Manufacturer's Association (NEMA) requirements. Electrical component parts shall be covered by the manufacturer's limited warranty.

5. Valves, fittings, level control switches and all other components must be designed and manufactured to resist the corrosive effects of wastewater and common household chemicals.

6. This system may be utilized on sites where soil and site conditions prohibit the installation of a conventional or modified subsurface disposal system.

7. Where the soil/site conditions are inadequate, the subsurface irrigation system may be

placed in a fill. The imported fill soil must be of a sandy loam texture and be incorporated into the existing soil surface by plowing. However, plowing is not necessary when the pipe is laid on the natural soil surface and the fill is merely used for protective cover. In such cases all vegetative material must be removed prior to laying the pipe and placing the imported fill.

8. Prior to the design of the subsurface drip disposal system, the suitability of the site must be demonstrated through acceptable soil permeability rates, acceptable soil conditions **[Table I]** and other topographic characteristics. The design and construction of the subsurface drip disposal system must conform to the manufacturer's specification and to the criteria as outlined in **FIGURE 1** of this design standard.

III. Treatment

The treatment method shall comply with the applicable sections of the Regulation Governing Individual Onsite Wastewater Disposal. The type of treatment must also conform to drip tubing manufacturers' specifications.

IV. Dosing Chambers

1. The dosing chamber shall have a minimum capacity of one and one half times the estimated daily flow.

2. The dosing chamber shall be equipped with an audible high water alarm, and a self-opening relief valve.

3. The high water alarm must be set so as to allow a reserve capacity equal to one day's estimated flow.

4. The dosing chamber shall have a grade level access large enough to allow servicing and/or removal of the largest component in the chamber. Access ports shall be protected against unauthorized entrance or removal.

5. The dosing chamber shall be vented through the grade level access or by means of a separate vent. In either case the vent shall be a minimum of one inch in diameter.

6. The dosing chamber shall be made of material resistant to the corrosive effects of wastewater and designed to withstand the lateral and bearing loads to which it is expected to be subjected.

7. All openings shall be sealed with a mastic, butyl rubber or other pliable sealant that is

waterproof, corrosion resistant and approved for use in contact with wastewater, in a manner to prevent the entrance of surface and groundwater.

V. Minimum Pump Specifications

1. Only subsurface drip disposal systems that provide for timed dosing are acceptable. On-demand dosing will not be considered.

2. The pumping system shall be capable of dosing the drip field a minimum of six equally spaced doses per twenty-four hour period. Each dose volume shall not exceed the estimated maximum daily flow divided by the number of dosing cycles.

3. The pumping system shall be designed to discharge the required volume of wastewater within the pressure range specified by the tubing manufacturer.

4. The pump shall be equipped with a low water cutoff to prevent damage to the pump during low water conditions in the dosing chamber.

5. The pump shall be constructed of corrosion resistant materials suitable for effluent pumping.

6. The pump shall be sized per manufacturers' specifications to meet or exceed the hydraulic requirement of the system.

7. The pump shall be installed in compliance with manufacturers' specifications so as not to violate pump warranty.

8. The suction and pressure lines shall be PVC schedule 40 or equal and be sized to meet or exceed the hydraulic requirements of the system.

VI. Minimum Filter Specifications

1. The filter shall filter the effluent to the specifications of the drip disposal tubing manufacturer to prevent clogging of the emitters.

2. The filter shall achieve the required filtration at a rate equal to or greater than the peak discharge rate, including filter and/or system backwash, from either the treatment facility or pump, whichever is applicable.

3. The filter performance shall be certified by an independent third party acceptable to the health authority. Verification from a manufacturer of filters or by an independent

professional registered engineer under his/her seal shall be acceptable as third party certification.

4. The filter shall be made of material resistant to the corrosive effects of wastewater and common household chemicals.
5. The filters shall be readily accessible for inspection and/or service.

6. The filter flush volume and velocity shall be per manufacturer's specifications.

7. The filter residue shall be returned to the treatment facility.

VII. Minimum Specifications for The Drip Field

Drip lines should be installed in the "A" horizon 6-8 inches deep. The maximum depth may not exceed 18 inches. In all cases there shall be a minimum of 12 inches separation between the water table or restrictive horizon.

1. The drip lines may be installed using any of the following methods:

    a. Installed in a trench excavated by a trenching machine.

    b. Installed using an approved plowing method. The insertion tool must be of the type that does not pull or stretch the drip line during insertion. The use of "cable plows" or any type insertion method that employs pulling the drip line through the plowed trench is prohibited.

2. A subsurface drip disposal system shall contain, if necessary, pressure compensating devices or regulators to ensure equal distribution from all emitters at +/- 10% of the designed discharge rate.

3. Lines shall be on contour and shall not be installed perpendicular (or up and down, etc.) to the slope; elevation difference in a line or the entire grid shall not exceed the manufacturers' specifications.

4. The length of each distribution line shall not exceed manufacturer's specifications to insure equal distribution to each emitter.

5. Vacuum breakers shall be installed as per manufacturer's specification, a minimum of one vacuum breaker/air release valve for each drip field zone.

6. All materials shall meet applicable ASTM standards and be resistant to common household

chemicals. Drip tubing must be certified by the manufacturer as designed and manufactured for the disposal of wastewater. The drip tubing must be color coded, by the manufacturer, to be easily identified as tubing designed for wastewater disposal.

7. Separation between emitter line laterals shall be a minimum of two feet.

8. Lateral spacing of three feet or more should be used for slopes of 20% or greater.

9. Drip tubing shall either be placed 4 inches lower than the supply manifolds or water breaks shall be used to prevent effluent from flowing from drip trenches to the supply manifold trenches.

10. Vacuum breakers shall be located in a protective enclosure that will prevent the accumulation of any substance that would prevent their proper operation and shall have a grade level access.

11. Equipment susceptible to freezing must be adequately protected to prevent freezing.

12. A system must be provided for the flushing of distribution lines to prevent the build-up of solids in the distribution system, with its discharge returning to the treatment facility. The system shall be capable of achieving a flushing velocity of a minimum of two feet per second. The return line must be permanently installed as a component of the system. A hose bib shall be prohibited as a component part of the drip disposal system.

VIII. System Placement

1. All components of the drip disposal system shall be located a minimum of:

   a. five feet from any dwelling.

   b. ten feet from any property line.

2. The aerobic treatment plant and pump chamber shall be located a minimum of 50 feet from any public, private or individual potable water source.

3. The drip disposal field shall be located at a lower elevation and a minimum of 100 feet from any public, private or individual potable water source.

4. Potable water lines shall not pass under or through any part of the drip disposal system. Where a water supply line must cross a sewer line, the bottom of the water service within ten feet of the point of crossing, shall be at least 12 inches above the top of the sewer line. The sewer line shall be of Schedule 40 pipe with cemented joints at least ten feet on either

side of the crossing. Water and sewer lines shall not be laid in the same trench. The water and sewer lines shall maintain a minimum horizontal separation distance of 10 feet.

5. The area of the disposal field shall not be used for vehicular traffic or vehicular parking.

6. Aerobic treatment plants, pump chambers and drip disposal fields shall not be located under dwellings or other permanent structures.

7. Drip disposal systems shall not be located in depressed areas where surface water will accumulate. Provision shall be made to minimize the flow of surface water over the drip disposal field.

8. Drip disposal fields located on slopes of less than eight percent shall have a minimum setback from recreational waters, shellfish waters or other sensitive areas as prescribed in **TABLE I**.

9. Drip disposal fields located on slopes of greater than eight percent shall be located a minimum of 100 feet from recreational waters, shellfish waters and other sensitive areas.

10. Where all or part of the drip disposal system is proposed to be installed on property other than the owner's, an easement in perpetuity shall be legally recorded in the proper county. The easement shall be of sufficient area to permit access, construction and maintenance of the drip disposal system.

11. No site for a drip disposal field or expansion area shall be approved which is located wholly within an area which is frequently flooded, swamp, marsh, or wetland. Except that if permits have been issued by the proper regulatory agency authorizing the use of wetlands for building sites and the installation of an individual onsite wastewater disposal system the property shall be evaluated using standard soil and site criteria for IOWDS.

12. When a proposed lot is located partially within a frequently flooded area, that portion of said lot not within the flood prone area may be considered for approval for the drip disposal field.

13. In soils that contain a restrictive horizon (fragipan, chalk, bedrock, clay or silty clay), within five feet of the surface, there shall be maintained a minimum of 12 inches of unsaturated soil between the bottom of the drip disposal system and perched or seasonal water table.

14. In soils that do not contain a restrictive horizon (fragipan, chalk, bedrock, clay or silty clay), within five feet of the surface, there shall be maintained a minimum of 24 inches of

unsaturated soil between the bottom of the drip disposal system and any perched or seasonal water table.

15. A minimum of 6 (six) inches of naturally occurring soil must be present above a restrictive horizon or a predominantly gray soil before placement of any fill.

16. To overcome the lack of sufficient depth, to a restrictive horizon and/or seasonal water table, a clean fill material of a texture of loamy sand, sandy loam or light loam may be used as fill. The fill material shall consist of a minimum of 70% sand particles equal to or greater than .25 mm. Clay content shall be 20% or less. Organic matter shall be removed, from the native soil surface, prior to placing and incorporating the fill. This fill must be incorporated into the native soil to prevent a textural interface from developing. When fill material is used the entire fill area must be sodded to prevent erosion, or other effective erosion control methods used. The full depth of fill material must extend at least two feet in all directions from driplines and at that point shall be sloped at a grade of no steeper than 3 to 1.

17. Easements or right-of-way areas for utilities, surface or subsurface drainage, roads, streets, ponds or lakes shall not be used as available space for location of a drip disposal system.

TABLE I

Setback Requirements from Sensitive Waters For all Subsurface Absorption Field Areas on Slopes of 8 Percent or Less:

*Soil Textural Class	Minimum Distance From Water Edge
Gravel (Skeletal)	Not Applicable
Coarse to medium sand, fine sand, loamy sand, sandy loam, silty clay, clay	100 Ft.
Loam, silt, silt loam, sandy clay loam, Silty clay loam, clay loam,	50 Ft.

*The texture of the subsoil material having the greatest permeability rates within the absorption area, inclusive of material to a depth of two feet below the absorption trenches or beds.

IX. Documentation

1. Distributor Operation, Maintenance, and Installation Instructions:

Complete, detailed instructions for installation, initiation of service, operation, and maintenance of the subsurface drip disposal system shall be provided, by the manufacturer, to the distributor and/or installer. Specific instructions shall include but not limited to:

a. Recommendations concerning types of wastewater which cannot be disposed of by the system.

b. Arrangement of plumbing connections.

c. Electrical wiring of components.

d. Installation instructions to cover proper location of the system in well drained areas and protection for vents, pumps, filters and controls from snow, ice, or water vapor accumulations.

e. Drawing with each major component numbered, and identified with the same designation on an illustration, photograph, or print.

f. Recommended frequency of maintenance; maintenance instructions; and procedures for removal and disposal of wastes.

2. User's Manual

A user's manual shall be provided to the consumer by the manufacturer with each drip disposal system. The manual shall include:

a. Model number.

b. Design and flow diagrams.

c. Limited warranty.

d. Replacement and service policy.

e. General installation instructions to cover proper location of the system in well-drained areas and; protection for vents, pumps, filters, and controls from snow, ice, or water vapor accumulations.

f. Detailed operation and maintenance requirements (including user responsibility, parts, and service).

g. Recommendations concerning types of wastewater which cannot be disposed of by the system.

h. Arrangement of plumbing connections.

I. Electrical wiring of components.

3. Limited Warranty

a. The manufacturer shall provide a two-year limited warranty, from date of installation, covering all parts and materials.

b. Each manufacturer shall furnish the user with a limited warranty identifying the replacement policy covering all mechanical and electrical component parts.

4. Initial Service Policy

a. A two year initial service policy shall be furnished to the user by the manufacturer, and shall be included in the original purchase price. This policy shall provide as a minimum:

b. Four inspection/service calls (at least one every six months) over the two-year period including inspection, adjustment, and servicing of mechanical, electrical, and other applicable component parts to insure proper function.

c. If any improper operation is observed, which cannot be corrected at the time of the service call, the user and the local health authority shall be notified immediately in writing of the conditions and the estimated date of correction.

5. Continuing Service Policy

Each manufacturer shall make available, for purchase by the user, a continuing service

policy with terms comparable to the initial service policy.

6. Standby Parts

Standby mechanical and electrical component parts shall be stocked by the local distributor for use when the drip system's mechanical or electrical components must be removed from the installation site for repairs.

7. Guaranteed Component Parts

The physical, mechanical and electrical component parts shall be guaranteed against any defects in material and workmanship as warranted. The cost of replacing damaged component parts, not due to reasonable wear and tear, is excluded from this provision.

8. Mechanical Component Parts

a. Mechanical component parts shall be protected against damage or impairment of efficiency by flooding or surcharging.

b. Mechanical component parts shall not require periodic maintenance or adjustment by the user other than changing a fuse and similar devices, or visual inspection of the warning light.

c. Mechanical component parts shall be covered by the manufacturer's limited warranty.

9. Service

Service shall be available within no more than two days following a request.

10. Service Label

A clearly visible, permanently attached label or plate, giving instructions for obtaining service, shall be placed at the audible signal.

X. Responsibility of The User

The user shall be responsible for maintaining and operating the subsurface drip disposal system according to regulatory agency and manufacturer's specifications.

XI. Designing The Absorption Field

Utilizing USDA soil groups as classified by textures is the most appropriate criteria on which to base loading rates for this system. This determination should be based on the most restrictive soil, naturally occurring within two feet of the ground surface or to a depth of one foot below the trench bottom, whichever is deeper.

TABLE II	DRIP ABSORPTION SIZING			
TEXTURE	LOAD RATE GPD/SQ.FT.	LIN.FT./ BEDROOM	ADD'L LIN.FT./ PERSON OVER 2 PERSONS/BR	DEPTH OF DRIP LINE IN INCHES
Gravel Coarse Sand				
Medium Sand Fine Sand Loamy Sand	.5	150	75	6 - 18
Sandy Loam Loam Silt Loam Sandy Clay Loam	.3	250	125	6 - 18
Silty Clay Loam Clay Loam Sandy Clay	.15	500	250	8 - 18
Silty Clay Clay	.05	1500	750	8 - 18

TABLE III

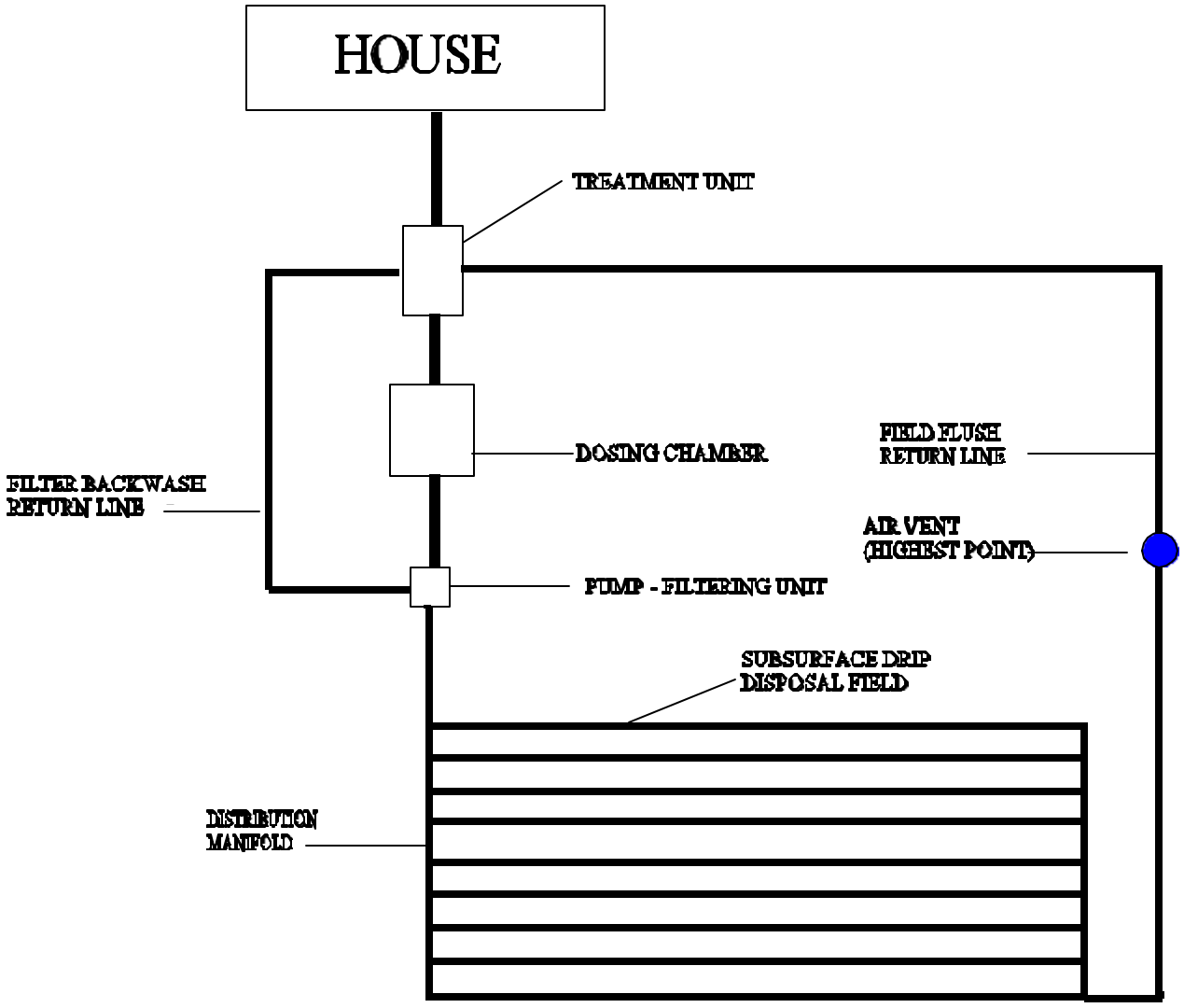
GALLONS/PUMP CYCLE
BASED ON 150 GALLONS/BEDROOM

	GALLONS PUMPED/ BEDROOM/CYCLE	ADDITIONAL GALLONS PUMPED PER PERSON OVER 2/BEDROOM
6 Pump Cycles/24 Hours	25	12.5
8 Pump Cycles/24 Hours	18.75	9.375
10 Pump Cycles/24 Hours	15	7.5

12 Pump Cycles/24 Hours	**12.5**	**6.25**

FIGURE 1
SUBSURFACE DRIP DISPOSAL

The system utilizes pressure distribution to evenly distribute treated effluent over a large area. The placement of subsurface drip disposal lines is in the upper six to eighteen inches of the soil. See **Table II** of the Regulation for specifications on locating and sizing subsurface drip disposal systems.



XII. Existing System Approval

In addition to the visual inspection conducted by the county environmentalist the following will apply:

1. The subsurface drip disposal system must be inspected by a factory authorized representative to verify that the system is functioning within factory specifications.

2. The factory authorized representative must furnish written verification, to the Department, that an inspection was made and the subsurface drip disposal system is functioning properly or has been repaired and is presently functioning properly.